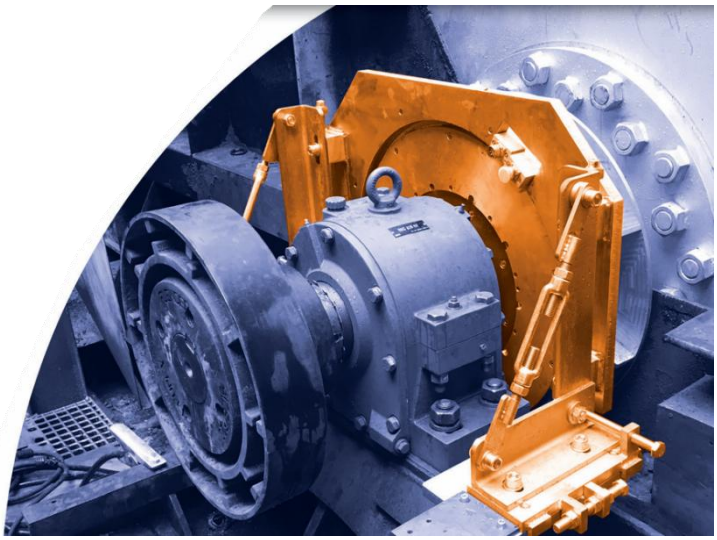
Hofmann.
Intelligent Balancing Solutions

Active balancing system AB 9000 PRO

Automatic balancing during operation for process fans



Fields of application

- All types of process fans (double inlet, single inlet, overhung)
- Easy retrofitting in existing fans
- Fully automatic balancing during fan operation
- Compensation of unbalance at operating speed
- Real-time monitoring of unbalance vibration

Advantages

- Balancing in one or two planes
- Universal retrofitting thanks to ring design
- Integrated field balancing function
- Increase fans availability
- Achieving the smoothest operation
- Time saving through fast electromagnetic drive and adaptive balancing method
- Automatic calibration procedure
- Neutral position function for manual pre-balancing
- Profibus / Profinet interface for connection to plant control system
- Windows based software user interface (HMI)
- Possibility of remote maintenance and condition monitoring

Description

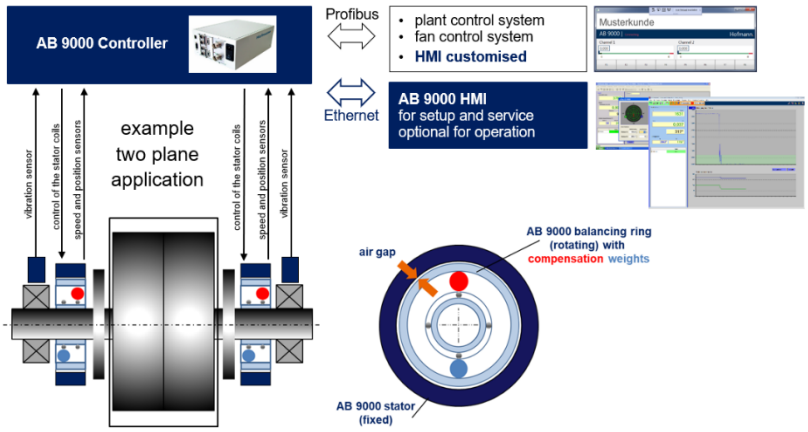
- The AB 9000 active balancing system from Hofmann compensates unbalance caused by buildup and wear on process fans.
  Balancing takes place fully automatically at operating speed so that the fan does not have to be stopped. The reduction in vibration results in fewer standstills, lower energy consumption and smoother running behaviour with increased process stability. The operating costs savings enable a quick amortisation period for the balancing system.

Functional principle

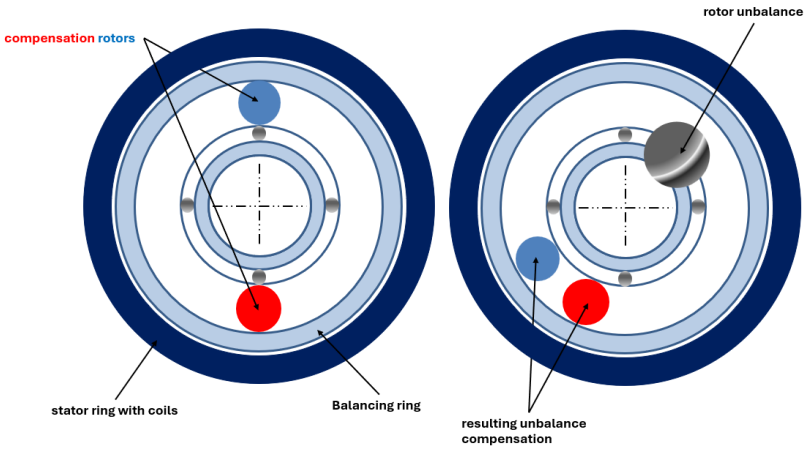
The AB 9000 active balancing system automatically compensates unbalances during fan operation. Two balancing rotors are arranged in the balancing ring part of a balancing unit, allowing them to move 360° on the rotor axis. If the balancing rotors are opposite each other, their effect cancel each other out. The full balancing capacity is achieved when both act at the same angle.

By adjusting to specific angles, any desired corrective unbalance can be generated within the specified limits, depending on the magnitude and direction. The measurement information - vibration, rotor speed and the angular positions of the balancing rotors - is recorded by fast measurement electronics equipped with adaptive algorithms. If the vibration exceeds the specified tolerance limits, a fully automatic balancing process is initiated. The balancing rotors are adjusted contact-free and wear-free via the control of the stator coils.

Adjustment, operation, and visualization of the automatic balancing process are carried out via PC software on a PC/laptop or directly on the HMI of a system control system. It also enables a field balancing procedure, for example, after cleaning or repairing the fan. For this purpose, the two balancing rotors are first set to neutral position, the unbalance of the fan is determined and then corrected manually.



Components of the AB 9000 balancing system



Functional principle of the spread angle method

System characteristics

The AB 9000 balances using a direct, adaptive process. The balancing rotor positions required for unbalance correction are calculated from the real-time measurement data. This saves correction time not only in the 1-plane balancing, but especially when balancing automatically in 2 planes.

Because the system automatically adapts to new boundary conditions after each correction step, changes in the fan's dynamic transmission characteristics, e.g. due to changes in temperature or speed, do not pose a problem.

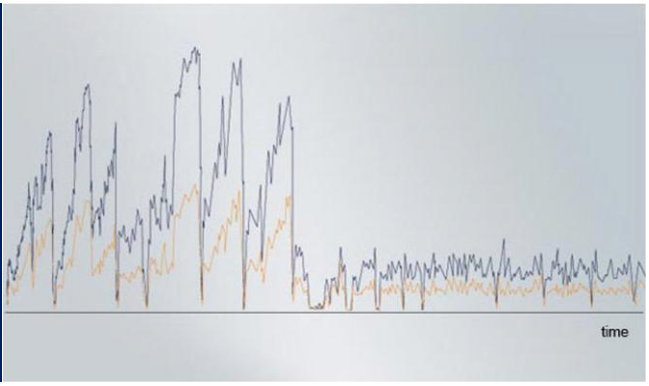
The innovative active AB 9000 provides a solution that can extremely effectively eliminate operational unbalance vibrations. This significantly increases the availability of the fans, considerably extends maintenance intervals and largely prevents production losses and downtime.

With its ring design, the AB 9000 can be easily integrated into new or existing fan designs.

Long-term vibration monitoring of a fan in the cement industry:

The diagram shows the long-term bearing vibrations behaviour of a fan rotor weighing approximately 12 tons before and after the installation of the AB 9000 system.

The vibration amplitude of the fixed bearing side (drive side – orange) and the non-fixed bearing side (non-drive side – blue) is shown over a period of nine months without AB 9000 and then with AB 9000.



Technical data

Measuring electronic AB 9000

Measuring channels	2
Max. controllable balancing units	2
Balancing planes	2x1 oder 1x2
Speed range	200 bis 50.000 rpm
Vibration units	µm, mm/s, m/s², g
Measuring range	0,01 bis 1.000 µm
PC interface	1x RJ 45
Profinet interface	2x RJ 45
Profibus interface	1x Sub-D 9 pin
Digital PLC interface	2x Sub-D 25 pin
Analog PLC interface	2x Sub-D 9 pin
Dimensions (WxHxD)	420 x 120 x 280 mm
Casing design	with 19" front panel
Electrical connection	230 V / 50 – 60 Hz / 400 W

Vibration sensor

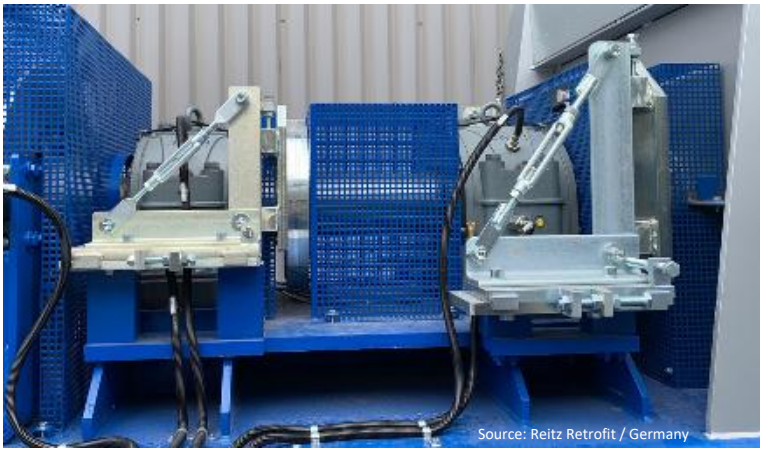
Accelerometer	HMA 1840
Input variable	Vibration acceleration
Sensitivity ± 10%	100 mV/g
Measuring range	+/- 50 g resp. +/- 500 m/s²
Overload limit (shock)	5.000 g
Protection class	IP 68
Housing material	Stainless steel, rustproof, anti-magnetic
Mounting type	M 6 screw thread
Connection	5 m fixed cable


Source: Venti Oelde / Germany

Balancing unit	Type 203	Type 305	Type 406
Max. Balancing capacity (kgm)	0,4	1,15	3,24
Max. Balancing speed (rpm)	2,300	1,800	1,250
Outside diameter of stator (mm)	410	560	700
Inside diameter of balancing ring (mm)	160	260	355
Max. shaft diameter (mm)	135	235	330

Scope of delivery

- Balancing unit BU 9000
- Taper lock for balancing ring
- Mounting bracket for stator
- Cooling disc (optional)
- Electrical cabinet with AB 9000 electronic
- PC-Software Visu CS 9000
- Vibration sensor
- Cable set
- Operator’s manual


Source: Reitz Retrofit / Germany

All information without obligation, subject to change without notice!